1

90163

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NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

Level 1 Biology, 2007

90163 Describe the transfer of genetic information

Credits: Three
9.30 am Tuesday 27 November 2007

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–10 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

For Assessor's use only	**Achievement Criteria**	
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe biological ideas relating to transfer of genetic information. ☐	Explain biological ideas relating to transfer of genetic information. ☐	Discuss biological ideas relating to transfer of genetic information. ☐
Overall Level of Performance ☐		

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You are advised to spend 40 minutes answering the questions in this booklet.

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QUESTION ONE

Persian cats show an inherited condition called PKD (polycystic kidney disease). PKD is caused by a dominant allele D. The recessive allele is d.

(a) **Describe** what is meant by **'dominant allele'**.

(b) **Describe** the **genotype(s)** of cats with PKD.

Two Persian cats that are **heterozygous** for PKD, are mated together.

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(c) Complete the Punnett square to identify the proportion of kittens from this mating that can be expected to have PKD.

The proportion of kittens that can be expected to have PKD is _____.

(d) **Explain** how two cats with PKD can have kittens that do NOT have PKD.

_____

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_____

QUESTION TWO

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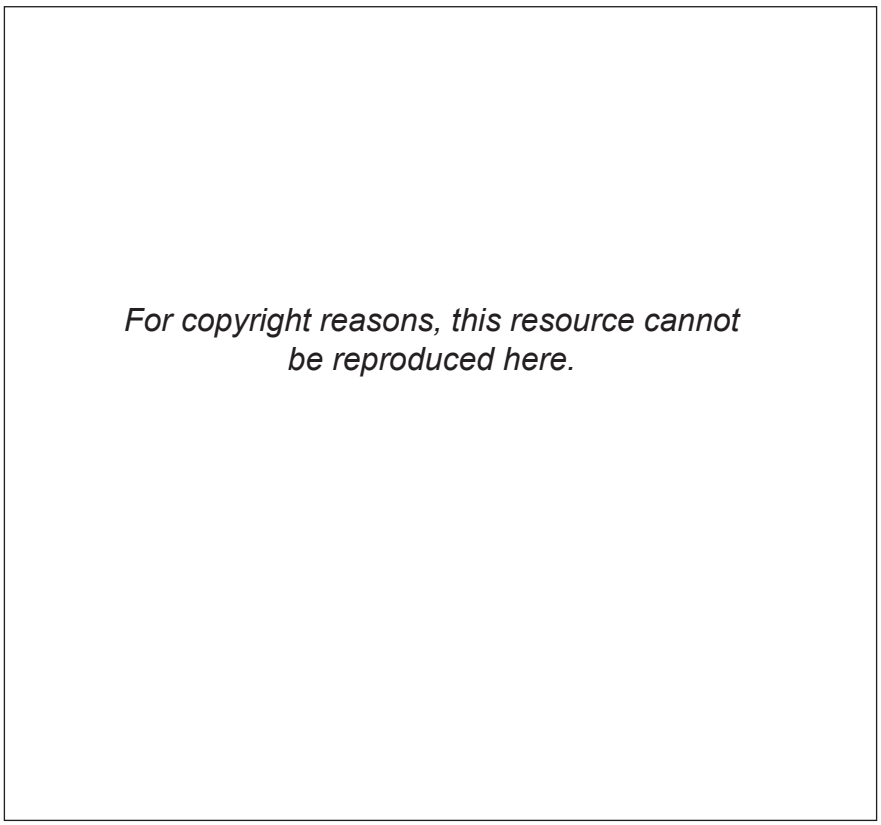
The diagram below shows a small section of DNA during replication.



Adapted from: http://www.accessexcellence.org/RC/AB/WYW/wkbooks/SFTS/SFTSg/7.gif

(a) **Describe** what a gene is.

(b) **Explain** how the process shown in the diagram above ensures accurate replication of DNA.

(c) **Discuss** the reasons why **accurate** replication of DNA is important for cell functions.

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QUESTION THREE

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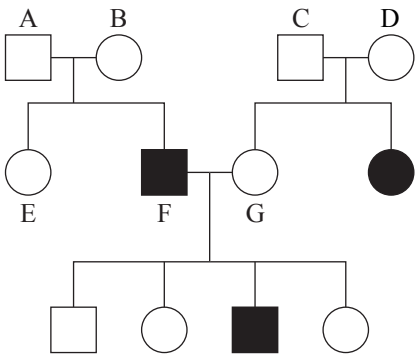
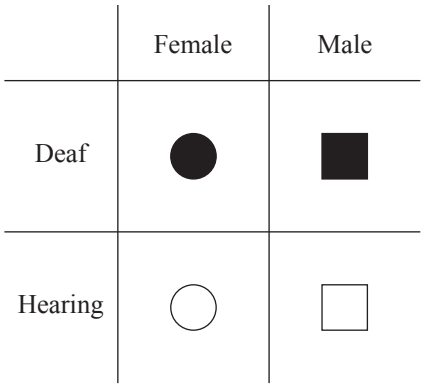
The pedigree diagram below shows the inheritance of a type of deafness in a family group.





(a) **Describe** the **phenotype** of Individual F.

(b) **Explain** how the pedigree diagram above shows that this type of deafness is caused by a **recessive allele**.

(c) Determine the genotype of Individual G and use this to **discuss** the reasons for the proportion of children of F and G who ARE deaf.
Use the alleles H for hearing and h for deafness.
You may use a Punnett square.

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QUESTION FOUR

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Potato plants can be reproduced either sexually from seeds, or asexually from the potato tuber or from stem cuttings.

http://www.io.com/~hcexres/textbook/instrxx4c.html

Cells in some parts of the potato plant undergo meiosis.

(a) (i) Where does meiosis occur in the potato plant?

(ii) **Describe** the purpose of meiosis.

(b) **Explain** how asexual reproduction of potatoes is an advantage to the grower.

(c) **Discuss** how the genetic characteristics of the potato crop could be improved by selective breeding.
Consider both sexual and asexual reproduction methods in your answer.

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Extra paper for continuation of answers if required.
Clearly number the question.

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Question number	

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